EPA Region 7 TMDL Review

TMDL ID	333	*Water Body ID*	IA 04-UDM-03985-L
Water Body Name	Ingham Lake		
Pollutant	Algae and Turbidity		
Tributary	Cunningham Slough, High Lake, West Slough		
State	Iowa *HUC*	0708010601	
Basin	Des Moines River		
Submittal Date	12/28/2004		
Approved	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

The TMDL for Ingham Lake was formally submitted by the Iowa Department of Natural Resources (IDNR) in a letter dated December 14, 2004 and received by EPA on December 28, 2004.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

The pollutant is defined as algae and turbidity linked to excessive nutrient loading. Phosphorus is targeted as the pollutant to reduce impairments. The Trophic State Index (TSI) was used to link the concentration of total phosphorus to the quantity of algae and turbidity in the system. A TSI for total phosphorus (TSITP) <70 was set as a target to achieve TSIs for chlorophyll (algae) and Secchi depth (turbidity) of <65. TSIs of <65 would meet the standard for algae and turbidity. The load capacity for phosphorus is set at 2,750 pounds per year to result in attainment of water quality standards.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Water quality standards and beneficial uses are described as well as applicable narrative criteria. Iowa Water Quality Standards list the designated uses for Ingham Lake as Primary Contact Recreation (class A1) and Aquatic Life (Class B(LW)). Ingham Lake was included in the 2002 303(d) list due to algae and turbidity impairments. The Class A designated use was assessed as "partially supported." The Class B use has been "fully supported/threatened" since 1992. Impairments are based on narrative standards that "such waters shall be free from materials attributable to wastewater discharges or agricultural practices producing objectionable color, odor, or other aesthetically objectionable conditions." Phase I targets for this phased TMDL are established based on improving the lake's trophic state to correspond to a Trophic State Index (TSI) value for total phosphorus of <70, and for both chlorophyll and Secchi depth of <65.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The State of Iowa does not have numerical water quality criteria for algae or turbidity. The TMDL uses the surrogate measure of TSI which links phosphorus concentrations to algal and turbidity conditions. By reducing the TSI for total phosphorus to <70 the TSIs for chlorophyll and Secchi depth should be reduced to <65 based on the relationships seen in this lake.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

There are no significant point source contributions of phosphorus to the lake. Annual loading from three nonpoint sources 1.) inflow from Cunningham Slough, West Slough, and internal load, 2.) watershed draining directly to the lake and 3.) airborne deposition account for the estimated 9,560 pounds of phosphorus per year. Loads from tributary waterbodies were not considered separately because of a lack of monitoring data. The treatment of watershed processes in the TMDL does not address the watersheds of Cunningham and West sloughs and may therefor not completely characterize the total effect of watershed processes on Ingham Lake. A 2004 assessment of the immediate Ingham Lake watershed showed row crop was the major land use. Additionally, the presence of three Confined Animal Feeding Operations (CAFOs) and four open feed lots was noted. There is limited low-density residential development and a camp on the lake

shore. All significant sources of phosphorus loading seem to have been considered in calculating the present load.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

Phase I of this TMDL is to reduce phosphorus loading to achieve an in-lake TSITP<70 resulting in TSIs for Secchi depth and chlorophyll of <65. This will be accomplished with a total phosphorus loading capacity of 2,750 pounds per year.

WLA Comment

There are no significant point sources for phosphorus in the watershed. The WLA is set to zero.

LA Comment

The load allocation based on target TSITP<70 is 2,470 pounds of phosphorus per year. Of this 2,350 pounds are allotted to inflows, internal recycling and watershed sources and 120 pounds to atmospheric deposition.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The margin of safety is explicit. The MOS is set at 280 pounds per year, this is a 10% reduction of the calculated allowable load.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

TSI targets are applied to the growing season when algal blooms are prevalent. The model selected uses growing season mean total phosphorus concentration to calculate an average annual total phosphorus load.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

TMDL Staff met with the Emmet County Conservation Board on July 1, 2004. A public meeting was held in Estherville on November 22, 2004 and the TMDL was placed on the IaDNR website for public review. Comments were reviewed and where appropriate, incorporated into the TMDL.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Follow-up monitoring will continue to meet, at a minimum, the minimum data requirements established by Iowa's 305(b) guidelines. An assessment will be completed by 2010 containing 3 lake samples per year for three years or 10 lake samples over a two year period. The TMDL program expressed its commitment to follow-up monitoring.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

No allowances for increased nonpoint source phosphorus loading were included in the TMDL. Significant changes in the watershed land use was deemed unlikely. No waste load allocation is included in this TMDL.
